

Inheritance: practice questions

5 questions • 18 marks • mark scheme at the back

For Edexcel GCSE Combined Science 1SC0. **Higher tier** is only on the Higher paper.

Name

Total / 18

1 Explain the meaning of the terms allele, dominant and genotype.**[3 marks]**

2 In pea plants, the allele for tall (T) is dominant to the allele for short (t). Two heterozygous tall plants are crossed. Use a genetic diagram to work out the ratio of tall plants to short plants in the offspring. **[3 marks]**

Answer =

3 Use a genetic diagram to show that the probability of a baby being a girl is 50%.**[3 marks]**

- 4** A genetic disorder is caused by a recessive allele. Two parents do not have the disorder, but they have a daughter who does. (a) Explain what this shows about the parents. (2) (b) The parents have another child. Calculate the probability that this child has the disorder. (1) **[3 marks]**

Answer =

[illegible]

- 5** In pea plants, the allele for purple flowers (P) is dominant to the allele for white flowers (p). Two heterozygous plants with purple flowers are crossed. Explain how this cross can produce both purple-flowered and white-flowered offspring, and predict the proportion of each. Use a genetic diagram in your answer. **[6 marks]**

[illegible]

Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [3]

- allele: a different version of the same gene (1)
- dominant: an allele that is expressed in the phenotype even when only one copy is present (1)
- genotype: the alleles an organism has (for a gene) (1)

2. [3]

- gametes from both parents T and t (1)
- offspring genotypes TT, Tt, Tt, tt (1)
- 3 tall : 1 short (1) allow 3:1

3. [3]

- mother's gametes X and X, father's gametes X and Y (1)
- offspring XX, XX, XY, XY (1)
- two out of four are XX / female so probability is 50% (1)

4. [3]

- (a) both parents are carriers / heterozygous (1)
- each has one recessive allele, which is masked by the dominant allele (1) allow: the daughter is homozygous recessive so must have inherited a recessive allele from each parent
- (b) 1/4 or 0.25 or 25% (1)

5. [6]

Level 3 5-6	A clear, logical explanation using correct terms, a correct genetic diagram, and a correct prediction of the proportions with the idea of probability.
Level 2 3-4	Some explanation using some correct terms, a mostly correct genetic diagram, and a prediction with minor errors or omissions.
Level 1 1-2	Simple statements with limited use of terms. The diagram may be missing or incorrect.

Indicative content

- both parents have genotype Pp (heterozygous)
- each parent produces gametes P and p
- gametes combine at random at fertilisation
- offspring genotypes PP, Pp, Pp and pp
- P is dominant so PP and Pp have purple flowers
- pp is homozygous recessive so has white flowers
- ratio 3 purple : 1 white
- probability of purple 75%, of white 25%